

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Hans-Christoph MAGEL  
Based on : PCT/DE 03/01078  
Title : Fuel Injection System  
  
Docket No. : R.302649  
Customer No. : 02119

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Date: February 23, 2005

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97(b),  
AND EXPLANATION OF THE RELEVANCE OF THE CITED PRIOR ART**

Sir:

The undersigned hereby requests that the prior art cited on the attached prior art statement be placed of record in the application file and be considered by the examiner.

This citation of prior art is made under 37 CFR 1.97(b), since it is being filed within three months of the filing date and before the mailing of a first Office action.

The relevance of the prior art cited on the attached form 1449 is as follows:

Appl. No. Unknown  
 IDS Under 37 CFR 1.97(b)  
 Prior to first Office Action

**US 6,189,509 B1**

This patent teaches a device for injecting fuel into a diesel engine using a pulsating flow pump. This improves fuel performance of engines by controlling the beginning and the end of the injection. It comprises a device (20) controlling the closing and opening of the nozzle needle (5) provided with a discharge circuit (21, 21') controlled by an electro-valve (25) in branched connection between the high pressure supply conduit (7) and the low pressure return conduit (8). The discharge circuit (21, 21') comprises a discharge valve (22) whereof the opening and the closing are slowed down by a calibrated orifice (23). The discharge valve (22) located upstream of a discharge orifice (27) provided on the return conduit (8) enables to deviate part of the non-injected fuel flow towards the nozzle needle (5) to exert thereon a closing pressure. Consequently, this results in a better control over the opening and closing of the nozzle needle (5). A calibrated valve (24) ensures that the pressure in the discharge circuit (21) is maintained between two injections. During the injection cycle, the supply of fuel towards the nozzle needle (5) is not impeded by the control device (20) components. The invention is applicable to diesel engines using pulsating injection pumps.

**US 5,771,865**

This patent teaches a fuel injection system of an engine. The system comprises a fuel tank, a fuel pressure pump for pressurizing a fuel supplied from the fuel tank, and an injector connected to the fuel pressure pump by means of a fuel pipe. The injector includes a nozzle connected to the fuel pipe by means of a fuel passage, a pressure chamber into which the pressurized fuel is introduced from the fuel passage, and a nozzle valve for opening and

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closing the nozzle depending on the fuel pressure in the pressure chamber. The system further comprises a fuel return passage connecting the pressure chamber and the fuel tank, and first and second solenoid valves for determining the start and termination of fuel injection through the nozzle.

**DE 199 39 429 A1**

This patent teaches a fuel injection device (1), comprising one or more pump-nozzle units or pump-line-nozzle systems (6) that correspond to the number of cylinders in an engine. The device also compresses the fuel. The fuel injection device is provided with a hydraulic pressure multiplier (10). The inventive device facilitates fuel injection over a wide speed range and with high precision using the pump-nozzle unit (6) and the pressure multiplier (10).

**US 6,513,497 B1**

This patent is in the same family as DE 199 39 429 A1 and is provided as an aid to the examiner.

**JP 6-93936**

This patent teaches a system to improve engine performance, reduce vibration noise, and to reduce the proportion of NOx in the exhaust gas. A pilot injection is used for smaller amounts of fuel and a main injection for large amounts of fuel. An accumulator fuel injection device is provided with a first accumulator (36) for high pressure fuel for assisting main injection, and a second accumulator (78) for low pressure fuel for assisting pilot injection. The opening/closing operation of a fuel injection nozzle is carried out in such a way that high

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pressure fuel of the first accumulator (36) is transferred to a nozzle needle (18) as a closing force. A three-way solenoid valve (34) is employed for eliminating closing force. Low pressure fuel for pilot injection and high pressure fuel for main injection is changed over by a second three way solenoid valve (86).

**DE 42 36 882 C1**

This patent teaches a fuel injection system using a high-pressure pump (2) and a number of electromagnetic fuel injection devices (5) with a common fuel supply line (4). Each fuel injection device has an electromagnetically-operated three-way valve (14) in the fuel path, with a valve element provided by a double piston shaft having a collar between the pistons on the set needle and the electromagnet side controlling a high pressure and low pressure connection. A high pressure space is defined between the piston on the electromagnet side and the collar and a low pressure space is defined between the collar and the piston on the jet needle sides with a choke between the low pressure space and a vent line provided by a transverse bore in the double piston shaft.

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DT01 Rec'd PCT/PTC 23 FEB 2005

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Prior to first Office Action

Examination of this application is respectfully requested.

Respectfully submitted,

Date: February 23, 2005

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**INFORMATION DISCLOSURE CITATION**  
(Use several sheets if necessary)

Docket Number (Optional)

R.302649

Application Number

10/525369  
23 FEB 2005

Applicant(s)

Hans-Christoph MAGEL

Filing Date

Group Art Unit

**U.S. PATENT DOCUMENTS**

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		6,189,509 B1	02-20-2001	Jean-Louis FROMENT			
		5,771,865	06-30-1998	Akio ISHIDA			
		6,513,497	02-04-2003	Bernd MAHR et al.			

**U.S. PATENT APPLICATION PUBLICATIONS**

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

**FOREIGN PATENT DOCUMENTS**

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
							YES	NO
		DE 199 39 429 A1	03-01-2001	Germany			✓	
		JP 6-93936	04-05-1994	Japan				✓
		DE 42 36 882 C1	04-21-1994	Germany				✓

**OTHER DOCUMENTS** (Including Author, Title, Date, Pertinent Pages, Etc.)


EXAMINER	DATE CONSIDERED
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.